Notes on the poorly-known Buckley's Forest Falcon *Micrastur buckleyi* including voice, range and first Brazilian records.

by Andrew Whittaker

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Buckley's Forest Falcon *Micrastur buckleyi*, also known as the Lesser Collared Forest Falcon, is one of the world's least known raptors, represented by only eleven known museum specimens (Collar *et al.* 1992). The type specimen was collected in 1888 from Sarayacu, Pastaza, Ecuador. Poor taxonomic understanding led it to be initially described as a race of Collared Forest Falcon *Micrastur melanoleucus* (= *semitorquatus*). Swann (1919) separated it from nominate *semitorquatus* on the basis of its smaller wing and tarsus, with feet being smaller and weaker. However, Traylor (1948) confirmed that *M. buckleyi* was a valid species, not only being smaller than *M. semitorquatus* in all dimensions with proportionately a much shorter tarsus, but also that it occurred sympatrically. The scarcity in collections of *M. buckleyi*, most of which were obtained historically (only two recently in 1977-78), combined with it being virtually unknown to Neotropical field ornithologists and having a restricted distribution in western Amazonia, led it to be listed as "threatened" (Collar *et al.* 1992). Here I present the first description of the species' voice, information on plumage, insight into its biology and new distributional records including the first records for Brazil.

Micrastur forest falcons are found exclusively in the Americas, inhabiting Neotropical rainforests ranging from Mexico south to northern Argentina (Brown & Amadon 1968, del Hoyo *et al.* 1994). Forest falcons are well adapted to their forested environments with long graduated tails and short rounded wings, allowing rapid flight and good manoeuvrability while hunting in thick undergrowth. Long strong legs allow greater agility within thick vegetation for running along branches or on the ground after prey (Thorstrom 1993). A combination of inhabiting dense forests, not known to soar or perform aerial displays and their elusive nature makes *Micrasturs* very inconspicuous, and therefore easily overlooked (Thiollay 1985). In fact *Micrastur*s are far more often heard than seen, vocal activity being principally around dawn and dusk. This habit is comparable to other rarely seen but regularly heard Neotropical forest dwellers, such as Tinamous, *Tinamus* and *Crypturellus* and Antpittas, *Grallaria* (pers obs).

Taxonomy and identification

The genus *Micrastur* currently consists of 6 species of forest falcon (Brown & Amadon 1989, Sibley & Monroe 1993, del Hoyo *et al.* 1994), which can be subdivided into two groups based on size. Large *Micrastur*s comprise Buckley's Forest Falcon *M. buckleyi*, Collared Forest Falcon *M. semitorquatus*, and Slaty-backed Forest

Falcon *M. mirandollei*, and small ones are Lined Forest Falcon *M. gilvicollis*, Barred Forest Falcon *M. ruficollis*, and Plumbeus Forest Falcon *M. plumbeus*.

Micrastur buckleyi is physically very similar to the larger *M. semitorquatus* but the lack of a large museum series, combined with a complete lack of any knowledge of the birds' biology, have combined to cause the taxanomic confusion. Traylor (1948) discovered that *M.buckleyi* deserved full species status while identifying a collection made by José M. Schunke in 1946 from Yarinacocha, Lorento Peru. He based his conclusion on three skins, one in the Chicago Natural History Museum (CNHM), from Yarinacocha, Peru and two from the American Museum of Natural History (AMNH), from eastern Ecuador, Rio Suno and San José.

The main morphological features separating the two species are size, principally in wing length and a proportionately shorter tarsus. A comparison of measurements from eleven male and ten female *M. semitorquatus* from Peru, Brazil and Bolivia with 4 male and one female *M. buckleyi* illustrates this smaller size difference well (Table 1). The bill also seems to be smaller in *M. buckleyi* (culmen of type 16mm) than in *M. semitorquatus,* (average 20 mm; n = 11, range 19-21 mm, Amadon 1964).

Given the striking similarities between *M. buckleyi* and *M. semitorquatus* in adult plumage, as well as poorly understood age-related plumage differences, great care is needed in field identification. Important field marks, e.g. the number of tail bars and the type and pattern of underpart markings, are highly variable in immature and subadult plumages of other *Micrasturs*. Also, *M. semitorquatus* shows great plumage variation with three distinct colour morphs in adult plumage: light morph (most common), rufous or buffy morph and a rare dark morph. No such colour morphs are yet known from *M. buckleyi* but with such a small sample this possibility remains to be determined.

Amadon's (1964) description of the first known female and immature plumages follows, with additional information I have noted from slides of specimens. The female (AMNH No. 230774) has conspicuous white marks on the scapulars. Two of these are near the tip of each feather and are oval in shape, while two others, half-concealed near the middle of the feather, are crescentric. There are also roundish white markings on the outer vanes of the secondaries and on a few of the upper wing coverts. *M. semitorquatus* never shows any white markings on scapulars and secondaries. The immature male (AMNH No. 181867) had the following distinctive

TABLE 1

Summary of biometrics of *M. buckleyi*, with its sister species *M. semitorquatus*. Each data set includes mean, range and sample size. Wing measurements are flattened chord.

Species	Wing	Tarsus
M. buckleyi (male)	213.25; 209-219;4	58.75; 55-62; 4
M. semitorquatus (male)	247.0; 237-257; 11	87.0; 82-91; 11
M. buckleyi (female)	217; 1	65.0; 1
M. semitorquatus (female)	267.0; 257-281; 10	87.0; 82-94; 10

plumage characters separating it from immature *M. semitorquatus*. Chest uniform tawny, with vaguest suggestion of blackish marks near the tip of the feathers and no barring, whereas *M. semitorqutus* underparts are tawny or buffy and boldly barred with crescentric blackish marks. Immature *M. buckleyi* has a rufous nuchal collar (tawny or buff in *M. semitorquatus*) and chest with which it is continuous. Under wing coverts and linings white, washed with buff, and with only the slightest indication of dark markings, whereas *M. semitorquatus* has conspicuous black or dark brown cross markings.

Useful field marks for *M. buckleyi* are its overall smaller size with a noticeably proportionately smaller head (pers. obs), and adults show three broad white tail bars, not including the buff/white pale terminal tail fringe. However, the number of tail bars can vary with age in *M. buckleyi* with sub-adults showing as many as 4 or as few as 2 broad white bars, not including terminal fringe. This field character can also be rendered difficult since wing tip projection can cover the uppermost tail bar, obscuring it from view in the field. *M. semitorquatus* adults normally show 3 tail bars, while immatures have from 4 to 6 white/buff tail bars, not including the terminal tail fringe. Female *M. buckleyi* show diagnostic white spots on the scapulars and secondaries, as previously described. Immatures have a striking bright tawny upper breast band and nuchal collar and duller rufous upper breast band, contrasting with buff throat and lower underparts with 4-5 widely spaced bold brown bars onto lower breast; remaining lower underparts are unmarked or the barring is less bold but extends down the flanks and thighs, being absent from the centre of lower underparts, with browner/blackish tail and bolder buffier tail bars and terminal tail fringe.

In Peru I noted the following description in the field from *M. buckleyi*: upperparts dark grey on both back and wings, contrasting with darker hood; tail slightly darker than back with 4 obvious white transverse tail bars, but upper band sometimes obscured by wing tips; tail with a terminal white fringe. Cere and lores yellow; bill dark grey/black, looking smaller in proportion to *M. semitorquatus*; eyes dark brown with bare yellow orbital skin and eyebrow. Underparts creamy white; yellow legs brighter than cere; white neck collar very broad and prominent; dull white ear coverts. This plumage most probably refers to a sub-adult male.

Vocalizations

The voice of *M. buckleyi* remained unknown to ornithologists until very recently, being confused with other *Micrastur* species, until Paul Coopmans (pers. comm.) tape-recorded the species' voice on 20 November 1993 at Sacha Lodge, Rio Napo, Ecuador. Voice recognition of *M. buckleyi* since has increased field records of this little known forest falcon in the past decade. Here I present the first detailed description of *M. buckleyi* vocalizations and include spectograms of its vocal repertoire (Fig. 1).

M. buckleyi, as with most *Micrastur*s, calls mainly *c*. 30 min leading up to dawn with a smaller peak around dusk (Thorstrom 1993). The pre-dawn calling period can be weather-dependent, dark skies often resulting in much less vocalization. This pattern of intense crepuscular vocal activity is clearly illustrated in *M. gilvicollis* in

Brazil, with 73% of all recorded calls between 0535-0555 h and 22% between 1745-1808 h during 41 days of dawn to dusk observations on four different adults (Klein & Bierregaard 1988).

Calls identified to date are:

Territorial advertising song

M. buckleyi's "territorial advertising song" is the most commonly heard call and consists typically of 2 loud notes "EEOK, OOW" (Fig. 1, C & E) or 3 loud notes "EEOK, OOW, ...ow" (Fig. 1, A & B). This can be described as a 2- or 3-note loud nasal call with a somewhat echoing quality, the first note more emphatic than the second and there is a marked pause before the third, which is quieter. Fig. 1 shows slight individual variation between two different birds. The slight differences in pitch are probably related to sex, the smaller males producing higher frequency notes than the larger females (pers. obs). Pairs may sing a "territorial advertising song" perched either closely together or widely apart (several hundred metres), the first bird using the 2-note call, while its mate joins in with a 1-note call. This gives the impression (from a distance) that only one bird is producing the 3-note version of the call. The pair call antiphonally and can continue for well over a minute. Another variation involves both birds using the 2-note song type.

Excited territorial calls

These calls are usually given during intraspecific territorial conflict or are often solicited by tape playback to a lone bird or pair, similar to the behaviour of *M. ruficollis* (Thorstrom 1993). This call (Fig. 1, D &.F) is a fast series of regularly spaced short notes varying in number (12-30), which gain gradually in volume, ending with two emphatic loud notes with a pause between them. ".....uk-uk-uk-uk-uk CAHO', ...OW". The long string of call notes sound almost like week laughter and could possibly be confused with a Laughing Falcon *Herpetotheres cachinnans*, or a female *M. semitorquatus* at the nest site (Thorstrom *et al.* 2000a,b). The intensity and number of notes can vary greatly after repeated tape playback, with more agitated birds adding more notes (Fig. 1, F), but all series always end with the louder emphatic two notes.

Territorial duet

This vocalization (Fig. 1, G) is heard mostly around dawn, with one of the pair starting with "excited territorial calls"; then its mate joins in with the 3-note "territorial advertising song". These calls are heard in territorial conflict, as well as being solicited by tape playback.

Food Begging Calls of young

These calls, recorded by J. Arwin, comprise of a persistently repeated series of short hollow notes "ow,ow,ow,OW,OW,OW,OW,OW,OW,OW,OW,OW,OW,ow,ow". The number of notes in each series varied from 14-17, lasting 8 or 9 seconds, and was repeated every 15-18 seconds for extended periods of over a couple of minutes.

The "territorial advertising song" is the principal and most commonly heard vocalization of *M. buckleyi*, and is distinguished from all four other sympatric *Micrastur* species "territorial advertising songs" as follows:

M. gilvicollis

This species' "territorial advertising song" is a repeated 2-note, rarely 3-note, lamenting bark "ar, há". Although *M. buckleyi*'s voice differs having longer phrases that are lower pitched, more widely spaced and much louder, *M. gilvicollis* is vocally the

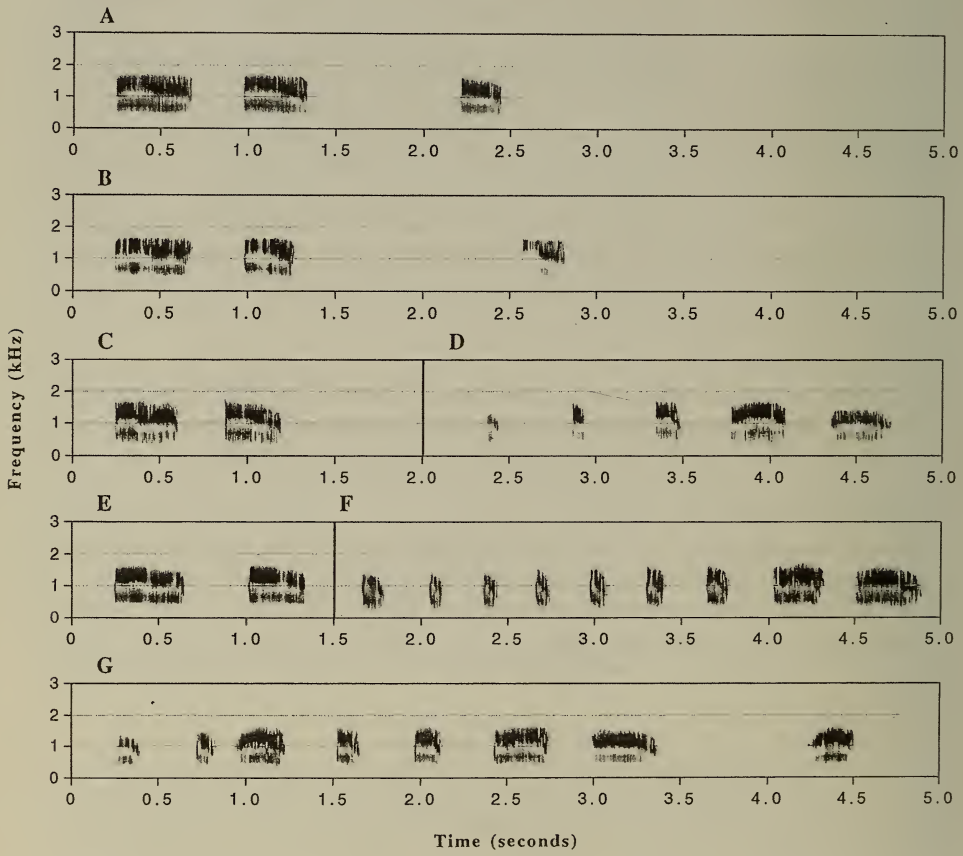

Figure 1. Spectograms of *M. buckleyi* vocalizations. All recordings by the author.
(A) 3-note "Territorial advertising song" Rio Pichana, Lorento, Peru, 21 May 1998. (B) 3-note "Territorial advertising song" Rio Amonia, Acre, Brazil, 15 December 1995. (C) 2-note "Territorial advertising song" Rio Bajé, Acre, Brazil, 15 December 1995. (D) "Excited territorial call" Rio Amonia, Acre, Brazil, 15 December 1995. (E) 2-note "Territorial advertising song" Rio Amonia, Acre, Brazil, 15 December 1995. (F) "Excited territorial call" of single bird in response to tape playback, Rio Amonia, Acre, Brazil, 15 December 1995. (G) "Territorial duet" of a pair of birds, Rio Amonia, Acre, Brazil, 15 December 1995.

most readily confused *Micrastur* with *M. buckleyi*. However, *M. buckleyi* gives the diagnostic 3-note call with the distinct long pause before the last note (Fig 1, & B).

M. semitorquatus
The "territorial advertising song" is a slowly repeated single loud hollow note "cow...cow...cow..." (Hilty & Brown 1986). Although morphologically the most similar to *M. buckleyi*, this difference in call is diagnostic.

M. mirandollei
This species' "territorial advertising song" is a series of 9-14 repeated, drawn out nasal notes, "ah, AAH, AAH, AAH, AAH, AAH, AAH, AAH, AHH", strikingly different from *M. buckleyi*.

M. ruficollis
The "territorial advertising song" is a long repeated series of distinct sharp barks that are often tirelessly repeated at short intervals, "ow, ow, ow, ... ", diagnostically different.

Distribution

Previously, *M. buckleyi* was known to occur in the tropical lowlands of western Amazonia, east of the Andes in Amazonian Ecuador and Peru and with a single hypothetical record from southeastern Colombia north of the Amazon (Hilty & Brown 1986).

Present records of *M. buckleyi* (Fig. 2) are exclusively from the lowland tropical rainforests. However, two skins in the British Natural History Museum, Tring, collected by L. Gómez in 1938 from the Cordillera de Cutucú, labelled at 1,800 m, are dubious as regards locality and probably come from a collection point also within the lowlands (Robert Ridgely pers. comm.).

The following observations confirm the occurrence of *M. buckleyi* in Brazil, all from the western-most Amazonian state of Acre and obtained during avian inventories along the Rio Juruá, between July 1991 and May 1995 (Whittaker & Oren 1999). I made tape recordings in the field using a Sony TCM 5000EM with a Senhiesser ME 60 directional microphone, and observations were carried out with 10X40 binoculars. All tape recordings will be deposited in the British Library National Sound Archive, London, UK.

1. An individual was tape-recorded at 0650 h (dawn) on 6 February 1992 at Porongaba, Acre on the east bank of the Rio Juruá. The bird was singing a " territorial advertising song" *c.* 200 m from the river bank in mature lowland transitional forest.
2. An individual was tape-recorded and observed while singing the "territorial advertising song" at 0645 h on 15 May 1995 at Seringuerinho in terra firme forest on the Rio Bajé, an east bank tributary draining into the upper Rio Juruá.
3. An individual was tape-recorded on 15 December 1995 in the late afternoon on the Rio Amonia, a tributary on the west bank of the Rio Juruá. This bird remained

hidden from view in a disturbed forest edge 250 m from the river. The terra firme forest here had a greater relief and large amounts of *Guadua* bamboo in the understorey. The following pre-dawn, at about 0630 h, I made another tape recording from the same locality and after tape playback a territorial pair of birds approached to within 100 m and I tape-recorded the pair dueting (Fig. 1 G).

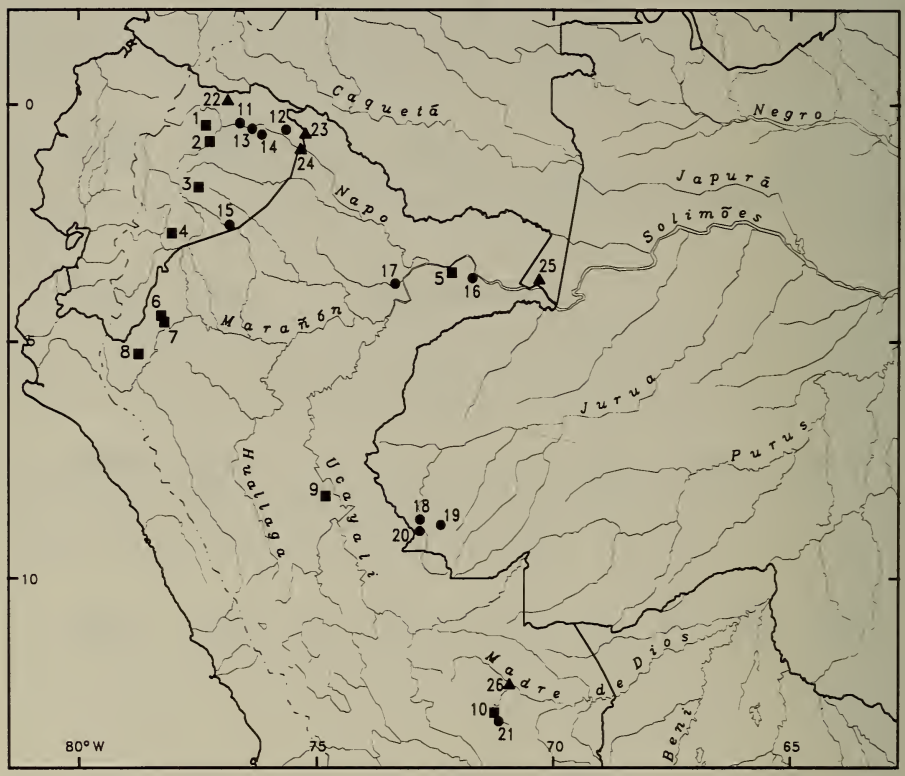

Figure 2. Geographical range of *Micrastur buckleyi*. Occurance at all points is shown by the following symbols: Voucher museum specimen = black square, voucher tape recording = black circle, hypothetical sight record = black triangle.

1- San José de Sumaco, Napo (Ecuador), 2- Rio Suno (Ecuador), 3-Type Pastaza (Ecuador), 4- Cordillera de Cutucú (Ecuador), 5-Orosa (Peru), 6-Kusú (Peru), 7-Rio Cenepa (Peru), 8-Perico(Peru), 9-Yarinacocha (Peru), 10-Hacienda Villacarmen (Peru) 11- La Selva Lodge (Ecuador), 12- Rio Pacuyacu (Ecuador), 13- Rio Napo, Sacha Lodge (Ecuador), 14-Tiputini (Ecuador), 15-Kapawi Lodge, Rio Pastaza (Ecuador), 16- Rio Pichana (Peru), 17-Iquitos, Amazonas (Peru), 18-Porongaba (Brazil), 19- Seringuerinho (Brazil), 20-Rio Armonia (Brazil) 21-Hacienda Amazonia, Atalaya (Peru), 22- Lago Agrio (Ecuador), 23- Lagartococha (Ecuador), 24-Rio Aguarico (Peru), 25- Rio Amacayacú (Colombia), 26- Boca de Manu (Peru).

4. J. Minns and R. Parrini (pers. comm.) tape-recorded one unknown *Micrastur* species at 0605 h on 14 September 1999 at Foz do Breu, Rio Tejo, an east bank tributary of the Rio Juruá, Acre, which I later confirmed to be *M. buckleyi*.

During fieldwork at Porongaba I recorded *M. semitorquatus* not only sympatric with *M. buckleyi* but syntopic, and at Quieto, along the Rio Amonia, I recorded all three large *Micrastur* species occurring sympatrically. The two smaller and more common *Micrastur*s, *M. ruficollis* and *M. gilvicollis* were also observed and tape-recorded from the extractive reserve, confirming that 5 species of *Micrastur* can be found sympatrically in Brazil in lowland terra firme forest along the upper reaches of the Rio Juruá. This I believe is the first documentation of a site containing five *Micrastur* species.

In addition, I include two new sight records of *M. buckleyi* from Peru:

1. I heard a distant *M. buckleyi* at dawn, 0600 h, on 20 May 1998 singing its "territorial advertising song" (Fig. 1 A) from terra firme forest on the south bank of the Amazon near the mouth of the Rio Pichana, Lorento department. After recording the bird's song and giving it c. 2 min of tape playback, I observed nothing until a group of Black-chested Moustached Tamarin *Saguinus mystax* gave their high-pitched alarm notes indicating an approaching predator. I then located a motionless forest falcon perched 25 m up on a dead snag in the canopy. After a short period a second bird, probably its mate, started to call from a concealed perch nearby.
2. At 0600 h on 7 April 1999 I recorded the 3-note "territorial advertising song" of a bird on the north bank of the Amazon river, in secondary growth bordering terra firme forest in a sandy belt region, 15 km north of the city of Iquitos, Lorento department.

These new records from Brazil extend the known range of *M. buckleyi* south of the Amazon east into Amazonian Acre, where it is confirmed as a territorial resident. However the exact eastward extent of its range within Brazil remains to be determined. *M. buckleyi* may well range further east into at least the upper Rio Purús drainage and possibly even extending into the Amazon of north western Bolivia.

The published records of *M. buckleyi* for Brazil reported in Collar *et. al* (1992) were erroneous and subsequently withdrawn by Wege & Long (1995). After closer examination of the Acre specimen reported by Collar, comparing it with the type specimen *of M. buckleyi*, it was confirmed to represent a previously unknown subadult plumage of a female *M. ruficollis concentricus* (pers. obs).

Behaviour

Encounters in the field with *M. buckleyi* within its forested environment are rare; it is an inconspicuous and elusive raptor. The few observations I made were of calling individuals or pairs, particularly after tape playback around dawn. A typical response to tape playback entices a lone bird or a territorial pair to approach silently, out of view in the thick cover in the sub canopy. On a perch they remain still and silent,

watching, and are therefore easily overlooked. However, after a delay from 10-15 minutes they sometimes start calling again, giving away their presence.

One vocalizing bird, observed in early morning as it perched on top of a dead snag over 20 m high in the sub-canopy of terra firme forest at a man made edge, threw it's head backwards c. 40 degrees each time it emitted the 3 note "territorial advertising song", lowering its head to a normal position between calling bouts. Another individual, seen flying a short distance through the canopy, upon landing on a dead stump shook its long graduated tail and then pumped it downwards towards the body a few times while looking around. After settling down on the perch the bird held its tail down vertically and then pushed it *c.* 10-15 degrees towards its body, holding it in this position.

J. Arwin (pers. comm), observed an adult *M. buckleyi* perched 1 m above an active army ant swarm at Tiputini, Ecuador. Other attendant obligate army ant birds, Sooty Antbirds *Myrmeciza fortis* and Goeldi's Antbirds *M. goeldii*, were following the front of the swarm along with several woodcreepers (Dendrocolaptidae), and all ignored the raptor's presence. This suggests that *M. buckleyi* was not hunting for birds but either reptiles or larger insects fleeing from the swarm. This behaviour has been noted for other forest falcons (Willis *et al.* 1983).

Nothing is known of the breeding of *M. buckleyi,* although J. Arwin (pers. comm.), reported two or possibly three fledged young and two adults at Tiputini Biodiversity Center, Ecuador, in August 1995 but the nest was not seen. The fledglings gave distinct "food begging calls" from the canopy of emergent trees. The young did not respond to tape playback of their own calls, but playback of an adult "territorial advertising song" solicited a strong response, with one fledgling leaping down from perch to perch out of the canopy, through the mid storey until it perched in the understorey only a few metres above the recordist. The fledglings were heard calling over the following week from the same general area within the forest. The same food begging call of *M. buckleyi* was also heard by J. Arwin (pers. comm.) at Manu Lodge, Peru in August 1997. The nest of *M. buckleyi* remains to be discovered, but it may nest in tree cavities, as do its relatives *M. semitorquatus* and *M. ruficollis* (Mader 1979, Thorstrom *et. al* 2000a, Thorstrom *et. al* 2000b).

Moult

The only moult data come from a female (AMNH No. 230774), collected from Orosa, Peru in November and an immature male (AMNH No. 181867) from Rio Chinchipe, Peru obtained on 30 July, which were both in tail moult. Post breeding moult in the adult in November would tie into the little of what we know of the species' breeding season, with fledged young still being fed at two different Peruvian sites in August.

Conclusion

Vocalizations of *M. buckleyi* remain not only the best form of identification currently available (due to identification difficulties with our current knowledge of plumage

variations) but also the best method of locating this elusive species. However, observers' familiarity with the voices of the commoner *Micrastur* species with which it is sympatric is essential. For many secretive and poorly-known Neotropical forest species vocal recognition is the most important key, for not only finding the species but also identification (Parker 1991, Whittaker 1998). Incorporating into survey work the method of "trawling" with tape playback of *M. buckleyi* "territorial advertising song" in suitable habitat at pre-dawn and dusk will greatly increase the possibility of finding this majestic forest falcon.

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Address: Conjunto Acariquara, Alexio, Rua Samaumas 214, Manaus, Amazonas 69085-053, Brazil; e-mail: Birding@internext.com.br

Vocal evidence of species rank for nominate Unicolored Tapaculo *Scytalopus unicolor*

by Paul Coopmans, Niels Krabbe & Thomas S. Schulenberg

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Salvin (1895) named a new species, *Scytalopus unicolor*, based on three specimens from northern Peru, and this species was recognized by later authors (e.g., Cory & Hellmayr 1924). However, during a revision of the genus *Scytalopus* (which formed the basis for the classification of the genus in Peters 1951 and Meyer de Schauensee 1966), Zimmer (1939) combined *unicolor* with four other taxa (*latrans, subcinereus, intermedius*, and *parvirostris*). Of this group, "*unicolor*" was the oldest name, and Zimmer's polytypic species took the name *Scytalopus unicolor*.

The songs of suboscine birds, such as *Scytalopus*, are believed to be entirely innate (Kroodsma 1982, 1984; see also Isler *et al.* 1998). Recent field studies (Whitney 1994, Krabbe & Schulenberg 1997) have shown that almost all *Scytalopus* taxa that were treated as subspecies by Zimmer (1939) should be elevated to species rank, primarily because of their diagnostically different vocalizations. Furthermore, Arctander & Fjeldså (1994) found a positive correlation between vocal and genetic differences in *Scytalopus*, and showed that allopatry and parapatry are no evidence of close relationship.

As part of a re-evaluation of the species limits of *Scytalopus* based on voice,